

****INCOMPLETE UNTIL SITE OPERATION****



AGIC BESS Emergency Response & Pre-Incident Planning

**Rancho Viejo BESS First
Responder Mitigation
Guidelines**

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Rev. 0

8-27-2024

First Responder Mitigation Guidelines

AES – Global Insurance

RANCHO VIEJO SOLAR & BATTERY ENERGY STORAGE SYSTEM

1452 NM 14, Santa Fe, NM 87508

Report Date: August 2024

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Document Control Number: Rancho Viejo -

Revision Number: 0

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Revision History

Revision Number	Authored By	Sections Revised	Reviewed By	Approved By	Revision Date
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1. Introduction

The AGIC Emergency Response Pre-Incident Planning Evaluation and First Responder Mitigation Guidelines were developed to provide specific Battery Energy Storage System (BESS) response guidance, emergency planning and training to first responders and AES BESS personnel and contractors for incidents involving BESS, specifically lithium-ion (li-ion) batteries and associated hazards (i.e., fire, explosion, toxic chemicals, arc flash, etc.).

First Responders may include ANY Organization responding to the **Rancho Viejo site.** (Santa Fe, NM). These include Emergency Services (First Responders, HazMat, Rescue, EMS, etc.), AES / BESS Personnel, and third-party contractors.

2. Purpose

The purpose of this document is to provide First Responders with awareness of typical but not exhaustive Risks & Hazards related to Energy Storage Systems during potential failure scenarios.

Wherever national, state, or local regulations or buyer or subcontractor health, safety, and environmental requirements differ from those described herein, the more stringent requirements shall apply. All employees, vendors, contractors, subcontractors, and visitors shall comply with applicable Health and Safety requirements. Failure to do so may result in personal injury or death.




READ THIS PROCEDURE BEFORE ENTERING THE SITE

WARNING!

REMAIN OUTSIDE THE FRONT GATE UNTIL ENTRY IS GRANTED BY THE AES / Ranch Viejo PERSONNEL.

- 1. Unless Rescue Operations Are Intended, BESS Container Fires Will Normally Require Defensive Suppression Activities with Exposure Protection.*
- 2. If a horn/strobe of a Container is alarming, wait 6 hours before approaching, with AES / Rancho Viejo Personnel approval and escort, then evaluate the affected equipment using Gas Detectors and Thermal Imaging Cameras. At that point, if there are any elevated heat or gas measurements, wait another 4 hours.*
- 3. In the event that the horn/strobe of a Container is not alarming, the site can be accessed with AES / Rancho Viejo Personnel approval and escort.*
- 4. Ensure First Responders wear the proper PPE, (e.g., Electrical, Fire, HazMat).*
- 5. Proceed with caution, visibly look for signs of overheating, white smoke/fog, or hissing sounds and evacuate if fire or smoke is observed from a Container, maintaining a minimum distance of 100ft (~30m) between all personnel and the affected Container. White fog or smoke could indicate off gassing batteries.*
- 6. Several Safety Systems associated with the Energy Storage run on the Auxiliary Power supply to the site. Therefore, this must never be disconnected, unless done so by AES / Rancho Viejo Personnel.*

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3. Site Emergency Contacts

NOTE: To access the BESS, contact the numbers below and await AES / Rancho Viejo Personnel at front gate for escort.

3.1 Rancho Viejo Emergency Contacts

EMERGENCY CONTACTS	CONTACT INFORMATION
Local and State Emergency Response Agencies	Emergency: 911 AES Remote Operations Control Center (ROCC) (855) 679-3553
Fire Departments	Santa Fe County Fire Department 35 Camino Justicia, Santa Fe, NM 87508 Non-Emergency: 505-992-3070
Police Department	Santa Fe County Sheriff Department 35 Camino Justicia, Santa Fe, NM 87508 Non-Emergency: 505-428-3720
Ambulance	Santa Fe County Fire Department 35 Camino Justicia, Santa Fe, NM 87508 Non-Emergency: 505-992-3070
Medivac (medical air transport)	Air Methods, Care Flight 121 Aviation Drive Santa Fe, NM 87507
Level I Trauma Center Medical Care & Work Injuries:	<u>Local Hospital</u> Presbyterian Santa Fe Medical Center 4801 Beckner Rd, Santa Fe, NM 87507 505-772-1234 <u>Regional Medical Center</u> St. Vincent Regional Medical Center 455 St Michaels Dr, Santa Fe, NM 87505 505-913-3361
Site Subject Matter Expert	TBD

Table 1 – Rancho Viejo Emergency Contacts



3.2 Remote Monitoring

Remote monitoring is provided by AES Clean Energy (AESCE) and the Salt Lake City UT ROC, Remote Operation Center. Contact via +1 855-679-3553, or Saltlake.rocc@aes.com.

4. Solar & Battery Energy Storage System (BESS)

4.1 Rancho Viejo Site Overview


The Rancho Viejo site is comprised of ~680 acres. This area contains BESS Containers, Solar, and other associated critical equipment. The combined rating of the site is 96 MWAC PV Solar, and 48 MWAC BESS.

AES Clean Energy Development is developing a 96 MWAC Solar PV and 48 MWAC Battery Storage System (BESS) project in Santa Fe, NM.

The project is expected to achieve Commercial Operation by 12-31-2028. Rancho Viejo Solar project will connect to substation where the output will be collected and stepped up from 34.5 kV to 115kV.

Rancho Viejo Solar	Rancho Viejo BESS
<ul style="list-style-type: none"> 96 MWAC Panel System 205,712 Jinko Solar, JKM590N-72HL4-BDV Solar Modules ATI Tracker, Dura Track HZ V3 104 1Px78 Trackers 1900 1Px104 Trackers 26 Modules in Series 7912 Strings 	<ul style="list-style-type: none"> 48 MWAC 4-hour BESS 38 CEN Enclosure Units Batteries: SAMSUNG SDI-E5S Deflagration Wall Panels Novec 1230 Suppression Smoke, Heat, & Gas Detection F-Stops

Table 2 - Equipment Quick View

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4.1.1 Rancho Viejo Solar & BESS Details

Rancho Viejo Solar is a project with 96 MWAC of photovoltaic (PV) system that is ac-coupled with a 48 MWAC 4-hour of Battery Storage System (BESS). The PV part of Rancho Viejo will have 25 SMA Sunny Central 4400 UP-US Inverters each sized 4750 A at ~35°C - ~60°C at the inverter terminals.

The PV Solar Panels are manufactured by Jinko Solar. They are Mono Bifacial Half Cell type; model JKM590N-72HL4-BDV, with a 590W rating. There are a combined total of 205,712 panels at this site.

The Rancho Viejo BESS Facility is a system that comprises multiple lithium-ion battery modules in racks, which are located inside temperature-controlled enclosures. The modules within a rack are connected in series and multiple racks within a container are connected in parallel to a DC busbar. Multiple containers are connected in parallel to the DC side of inverters. The AC side of the inverters are connected to step-up transformers before being connected to the grid.

There are 38 CEN Containers containing an Emergency Shutdown (F-Stop), Fire/Smoke Detection Systems, Gas Detection, Deflagration Panels. One Container houses 216-240 battery modules with capacity to house up to 252, along with air conditioners and liquid cooling via chiller. The Batteries are Lithium ion- Samsung SDI-E5S Battery Modules.

Main System Components:


The Rancho Viejo Site contains:

- (38) CEN Solutions Containers.
 - 9.5-foot-wide x 40-foot-long x 8-foot-high Metal Shipping Type Container.
- (205,712) Jinko JKM590N-72HL4-BDV Solar Modules.
- (1) 34.5 kVA, 690 V / 2000 kVA, Aux Transformer.
- (19) GPTech 3MsWD3-V730, 3.607 MVA Rated / 1500VDC, Inverters (BESS)
- (19) 3210 MVA 34.5kV - 730V Oil based MVTs
- (25) SMA Sunny Central 4400 UP-US Inverters 4400 MVA Rated/ 1500 V DC, Air cooled Inverters. (Solar)
- (25) 4.400 MVA MV XMFR, 34.5kV - 645V, Oil based
- (7056) Lithium ion- Samsung SDI-E5S Battery Modules.

Fire & Safety Components:

Each BESS container is fitted with:

- Air Conditioners and Liquid Cooled Chillers

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- Dehumidifier
- Interior lights
- Interior and exterior receptacles
- Deflagration panels
- NC 1230 (Novec) fire suppression
- Smoke detectors
- Horn/Strobe
- Manual fire extinguishing release controls mounted externally in weatherproof boxes.
- Gas detectors, monitoring carbon monoxide (CO) and hydrogen (H2).
- All fire/gas detection and suppression equipment is connected to a Simplex 4004r fire detection and release panel within each container.
- E-Stops

The BESS units are provided by CEN Solutions and comprise a standard 40-foot shipping container, modified to contain the 12 modules in each of the 20 strings within the structure.

The BESS containers are adequately separated by approximately 22 feet which meets FM-Data Sheet 33 - *LITHIUM-ION BATTERY ENERGY STORAGE SYSTEMS* separation requirements.

The Novec 1230 is an extinguishing agent, where discharge contains a colorless, nearly odorless, non-conductive, and fast-evaporating liquid that extinguishes the fire thanks to a cooling effect, reducing the flame's thermal power and interrupting the combustion reaction.

The fire suppression system(s) at the BESS containers are designed to suppress small fires within the ancillary equipment and there is no expectation that a thermal runaway type fire within the battery banks will be suppressed. Thermal runaway produces explosive gasses prior to ignition, and it is anticipated that early warning will be provided by the gas detection system within each container.

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5. Hazards

Lithium-Ion Batteries (NFPA 855 Appendix B)

Rancho Viejo BESS uses Samsung SDI ESS Li-ion battery modules, utilizing Lithium Nickel Cobalt Aluminum Oxide (NCA) chemistry.

5.1 Fire Hazards

Normal Conditions

Fire hazard are present from potential electrical equipment failure and thermal runaway

Abnormal Conditions

Thermal runaway potential exists during abnormal conditions as well as increased risk for short circuiting.

Thermal runaway is one of the primary risks related to lithium-ion batteries. It is a **phenomenon in which the lithium-ion cell enters an uncontrollable, self-heating state**. Thermal runaway can result in: Ejection of gas, shrapnel, and/or particulates (violent cell venting) and extremely high temperatures.

Under abnormal conditions batteries may be subjective to the production of off gases to include, but not limited to Hydrogen, Hydrogen Fluoride, Hydrogen Chloride, Carbon Monoxide, Methane, Ethane & Ethylene gases which may result in smoke, fire, and/or explosion. **Due to various gases present (listed above) appropriate PPE, including SCBA, protective clothing should be worn.**

5.2 Electrical Hazards

Normal Conditions

A Battery Energy Storage site contains electrical equipment with voltage ratings up to 34.5kV or above. Arc flash labels are present on all devices where arc flashes may occur.

Arc flash labels are present on all devices where arc flashes may occur.

Battery equipment contains stranded or stored electrical energy during routine maintenance, even when disconnected. **Batteries can only be isolated by trained AES site personnel.**



Abnormal Conditions

Battery equipment contains stranded or stored electrical energy even when disconnected. **Batteries can only be isolated by trained AES personnel. Relocation or moving of equipment is hazardous and can result in serious injury unless performed by AES personnel. This includes operations associated with fire extinguishment overhaul.**

Power Disconnect- Container power can be isolated from the main breaker using the (F-STOP) button.

5.3 Physical Hazards

Normal Conditions


High Voltage Lines

Abnormal Conditions

Lithium-ion batteries may present fire and explosion hazards.

Containers with deflagration panels will direct explosion pressure to the sides.

Limited physical hazards associated battery trays.

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6. Action Plan



- 1. Information in this section is to be reviewed alongside a NFPA 1660 (1620) compliant Pre-Incident Plan (PIP)**
- 2. The action plan describes the recommended personnel response during an emergency event based on its progression. The process flow illustrates the recommended actions as shown below:**

6.1 Pre-Incident Activities

Familiarization Tour – Fire department (FD) response is provided by Santa Fe County Fire Department, 35 Camino Justicia, Santa Fe, NM 87508. Site tours should be scheduled and completed annually.

The purpose of the tours are site and hazard identification and familiarization with review of the PIP and this guide. **At a minimum, the tours include, but not limited to:**

- Site overview and operation by AES (PPE requirements etc.)
- Hazard Familiarization (normal and abnormal conditions)
- Site review (points of entry, roadways, staging location, utilities, overhead hazards)
- Emergency Shut Down Location (AES Use Only)
- Means to monitor temperatures and LEL
- AES procedure for Entry
- FD policy and procedure for Utility Response
- Identification of Signage
- Validation of the latest Pre-Incident Plan revision shall be validated.

Emergency Response Notebook –The Fire departments shall be given a Response Notebook containing the BESS Pre-Incident Plan (PIP) and First Responder Mitigation Guidelines.

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Emergency Indication – Upon indication of smoke, fire, Emergency Medical or HazMat incident the AES personnel will notify the fire department.

6.2 Incident Activities

Incident Notification – Upon notification of incident at, the Fire Department are recommended to respond with the appropriate emergency response.


Prior and During Response – The Fire Departments are recommended to review the Response Notebook for Emergency Response data pertinent to the BESS.

If a horn/strobe of a Container is alarming, wait 6 hours before approaching, with AES / Rancho Viejo Personnel approval and escort, then evaluate the affected equipment using Gas Detectors and Thermal Imaging Cameras. At that point, if there are any elevated heat or gas measurements, wait another 4 hours.

Staging – Upon arrival at the Rancho Viejo BESS site, The FD will stage at the main gate and await escort to the BESS. **DO NOT PROCEED WITHOUT ESCORT.**

Analyze the incident with AES personnel and identify the hazardous materials that could be present (See abnormal conditions in the hazard section).

- Are there any known personnel within the BESS area? Have all personnel been accounted for and documented?
- Identify from AES the nature of the incident. Seek firsthand discussion with persons identifying the incident if available.
- Has the Suppression System or Fire Detection System activated?
- Has visible smoke been detected?
- Is there Visible Fire?
- Survey the hazard/incident and predict likely behavior of the hazardous materials that could be present during abnormal conditions (see section 5).
 - Is there venting of off gases?
 - Are the utilities active?
 - Is there a potential for deflagration?
 - What are the Container temperatures and LEL measurements?

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Initial Entry – **During an event (heat, smoke, or fire) there will be no entry, unless there is a rescue operation.** When approved for initial entry into the BESS; Utilize Self Contained Breathing Apparatus (SCBA), Gas detectors (i.e., Hydrogen, etc.), and Thermal Imaging Cameras; Ensure Personal Protective Equipment (PPE) worn protects against thermal, electrical and HazMat hazards. **Unless Rescue Operations Are Intended, Containers Fires Will Normally Result in Defensive Suppression Activities with Exposure Protection Priorities.**

NOTE: Stranded Energy Will Be Present, Even After BESS Power Has Been Disconnected “Batteries Are Still Energized.”

Battery Failure – Impending Battery Failure Signs include bulging and overheating, white smoke/fog & hissing; **Immediately Evacuate BESS Area (Should maintain minimum of 100 ft distance from the effected BESS).**

Suppression – If Management and fire department(s) decide to fight the fire to enable rescue operations, utilize Water Fog Pattern @ 10-degree angle @ 5-ft minimum distance AND DO NOT physically come in contact with the Batteries and Battery Frames. **Unless rescue operations are intended, containers fires will normally result in defensive suppression activities with exposure protection priorities.**

BESS Fire Protection System – The Battery Storage Containers are provided with a Novec 1230 gaseous fire suppression system.

Fire Extinguishers – Do NOT utilize Class D Fire Extinguishers.

FD Salvage and Overhaul Operations – **Do NOT perform Salvage Operations (Stranded Energy, continues to exist).**



7. Site Graphics

7.1 Site Access Point

NOTE: To access the site please contact the Emergency Numbers noted in Section 3.1.

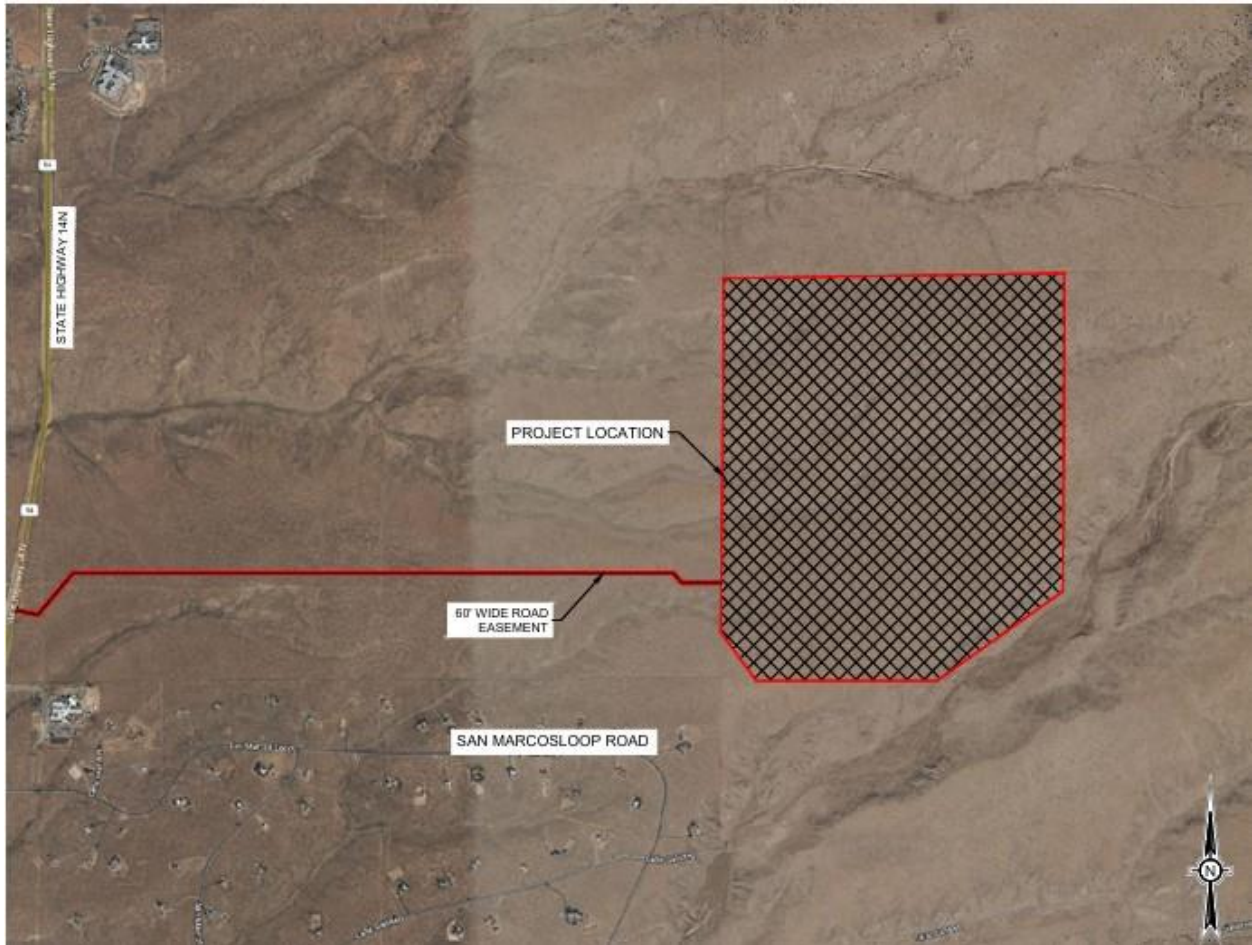


Figure 1 – Projected Site Access Point

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7.3 Fire Protection Features

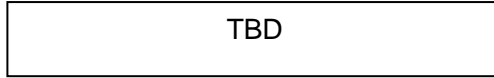


Figure 3 – Projected Fire Alarm Panel (F) STOP

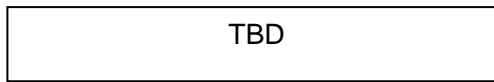


Figure 4 – Projected Fast Stop Button Closeup

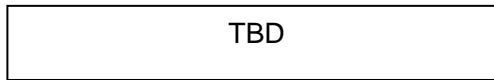


Figure 5 – Projected FACP Interface

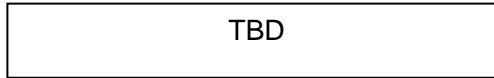


Figure 6 – Projected Smoke Detection

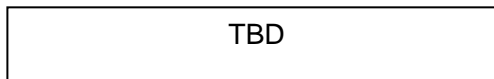


Figure 7 – Projected Novec 1230 Fire Suppression System

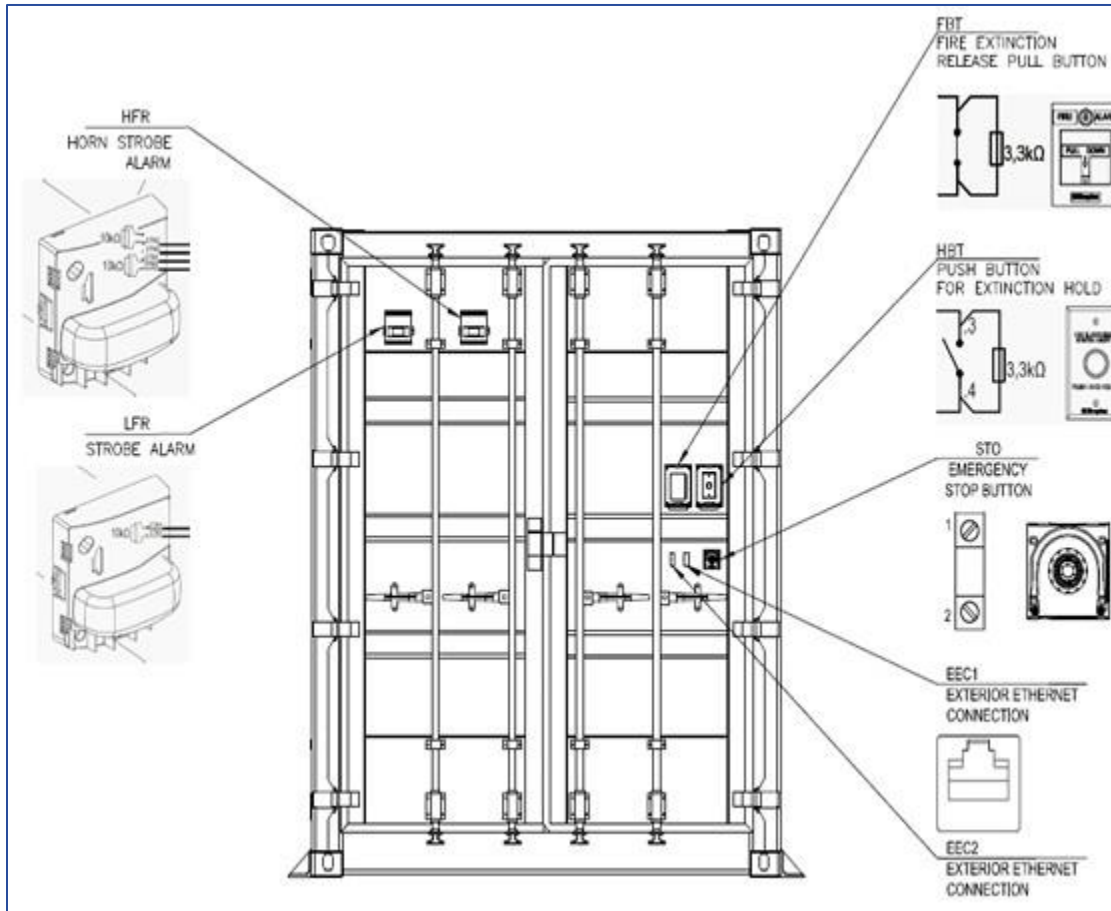



Figure 8 – Projected CEN Exterior Emergency Devices

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8. Emergency Response Protocols

Summary of report of smoke or fire (also see Pre-Incident Plan)

Rancho Viejo solar project BESS fire and rescue response is provided by Santa Fe County Fire Department (SFCFD). SFCFD has both paid and volunteer firefighters/EMS personnel.

SFCFD has several stations throughout the county. The first response on report of smoke or fire is station # 60 located at 39 Rancho Viejo Blvd 5.7 miles/8 minutes with four personnel including one engine and a medic. Additionally, station # 61 located at 58 County Road 62, 10.9 miles/15 minutes will respond as requested. Three additional stations are within a twenty-minute response time as well as the City of Santa Fe Fire Department if requested.

SFCFD does not have a HAZMAT team but utilizes the City of Santa Fe Fire Department 16 miles/24 minutes.

Santa Fe County Fire Department

1. Both paid and volunteer personnel
 2. Additional equipment/personnel available on as needed basis from other SFFD stations.
 3. All are State Certified FF1/FF11, EMT-B, AEMT, Paramedic, Wildland S-130/190.
 4. SFCFD career units are paramedic level Advanced Life Support (ALS) response.
 6. Air Ambulance, available through Air Methods Care flight 5, located at Santa Fe Regional Airport. 9 miles/14 minutes ETA.
 7. The nearest Trauma Center to the facility is Presbyterian Medical Center located at 4801 Beckner Road. 6.6 miles/11 minutes
- St Vincents Hospital located at 455 St Michaels Drive. 12.7 miles/17 minutes

POC: Bobby Montoya, Asst. Chief SFCFD

Email: bmontoya@santafecountynm.gov

NOTE: See Rancho Viejo Solar Project Pre-Incident Plan for additional information.

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9. Appendix A

Battery Safety Data Sheet(s)